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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/096,113	06/11/1998	GERNOT HOYLER	P98.0318	1423

7590 05/19/2003

SCHIFF HARDIN AND WAITE  
PATENT DEPARTMENT  
6600 SEARS TOWER  
233 SOUTH WACKER DRIVE  
CHICAGO,, IL 60606

EXAMINER

JONES, HUGH M

ART UNIT	PAPER NUMBER
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2123

DATE MAILED: 05/19/2003

22

Please find below and/or attached an Office communication concerning this application or proceeding.

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# Office Action Summary

Application No.  
**09/096,113**

Applicant(s)

**Hoyler**

Examiner

**Hugh Jones**

Art Unit

**2123**



-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136 (e). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on Dec 16, 2002.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11; 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above, claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-20 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claims \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.  
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some\* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \*See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s). 21 6) ☐ Other:

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## **DETAILED ACTION**

### **Introduction**

1. Claims 1-20 of U.S. Application 09/096,113, filed 06/11/1998 are pending. An Appeal Brief was filed 10/3/2000 along with a request for a Oral Hearing. The Board of Patent Appeals and Interferences reversed the Examiner on 11/19/2002. The application was consequently allowed on 12/6/2002. Applicants subsequently filed a request for an RCE in view of the submission of an Information Disclosure Statement (paper # 21 - 12/16/2002). The explanation of relevance was that the Song et al. reference was cited in a European search (search performed on 23 May 2002). This reference has been considered and an Official Office Action is hereby issued.

### **Claim Rejections - 35 USC § 112**

2. Claim 13 is rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. There does not appear to be enabling support in the specification for determining the electromagnetic compatibility of a single body. As Applicants disclose (page 1, specification), Compatability means:

“Capacity of an electrical device to function satisfactorily in its electromagnetic environment without unacceptably affecting this environment, which is shared by other devices.”

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The above definition means that a particular device (*victim*) will not be adversely affected by the electromagnetic field of another device or “body” (*aggressor*). The terms *victim* and *aggressor* are well known terms in the art of electromagnetic interference and compatability. The issue is the following. Claim 13 recites:

“The method according to Claim 1, wherein the *electromagnetic compatability* of the *body* is determined.”

Electromagnetic compatability is a *relationship* between two or more bodies or devices. The criterion is “*without unacceptably affecting this environment*”. For example, a radio may be affected by the 60 Hz electromagnetic field of power lines. In order to determine whether the radio would be unacceptably affected by the power lines, the following would have to be determined:

- the strength of the field radiated from the power lines;
- the distance between the power lines and the radio (since all real waves are attenuated with distance);
- the degree of coupling (the electromagnetic fields can be shielded by using filters, etc.);

To carry out this study, one would need to know the field of the “*body*” in question *as well as* details pertaining to the victim circuit. Compatability is a characterization of a certain type of interaction, and *has no meaning for a single object*.

Referring again to Applicant’s definition, namely:

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"Capacity of an *electrical device* to *function satisfactorily* in its electromagnetic environment without unacceptably affecting this environment, which is shared by other devices."

Applicants have not claimed "*an electrical device*" and the criterion for "*function satisfactorily*".

**Claim Rejections - 35 USC § 102**

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless --

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. **Claims 1, 4, 6-8, 14, 19 are rejected under 35 U.S.C. 102(b) as being clearly anticipated by Song et al..**

5. Song et al. disclose that the fast multipole method (FMM) speeds up the matrix-vector multiplication in the conjugate gradient (CG) method when it is used to solve the matrix equation iteratively. The FMM is applied to solve the problem of electromagnetic scattering from three dimensional arbitrary shape conducting bodies. The electric field integral equation (EFIE), magnetic field integral equation (MFIE), and the combined field integral equation (CFIE) are considered. The FMM formula for the CFIE has been derived, which reduces the complexity of the matrix-vector multiplication from  $O(N^2)$  to  $O(N^{1.5})$ , where  $N$  is the number of unknowns. With a nonnested method, using the ray-propagation fast multipole algorithm (RPFMA), the cost of the FMM matrix-vector multiplication is reduced to  $O(N^{4/3})$ . Song et al. have implemented a

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*multilevel fast multipole* algorithm (MLFMA), whose complexity is further reduced to  $O(N\log N)$ . In particular, note section 2 and formulas 4-7 which mathematically describe the *multilevel multipole* expansion as claimed.

**Claim Rejections - 35 USC § 103**

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
  2. Ascertaining the differences between the prior art and the claims at issue.
  3. Resolving the level of ordinary skill in the pertinent art.
  4. Considering objective evidence present in the application indicating obviousness or nonobviousness.
8. **Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Song et al. in view of Marshall.**

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9. Song et al. disclose that the fast multipole method (FMM) speeds up the matrix-vector multiplication in the conjugate gradient (CG) method when it is used to solve the matrix equation iteratively. The FMM is applied to solve the problem of electromagnetic scattering from three dimensional arbitrary shape conducting bodies. The electric field integral equation (EFIE), magnetic field integral equation (MFIE), and the combined field integral equation (CFIE) are considered. The FMM formula for the CFIE has been derived, which reduces the complexity of the matrix-vector multiplication from  $O(N^2)$  to  $O(N^{1.5})$ , where  $N$  is the number of unknowns. With a nonnested method, using the ray-propagation fast multipole algorithm (RPFMA), the cost of the FMM matrix-vector multiplication is reduced to  $O(N^{4/3})$ . Song et al. have implemented a multilevel fast multipole algorithm (MLFMA), whose complexity is further reduced to  $O(N \log N)$ . In particular, note section 2 and formulas 4-7 which mathematically describe the *multilevel multipole* expansion as claimed.

10. Song et al. do not disclose determining the electromagnetic compatibility of the body. Marshall discloses such a teaching.

11. It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the teaching of Song et al. with the teaching of Marshall because the testing of a variety of electrical and electronic apparatus is carried out to ensure compatibility with the electromagnetic environment (Marshall - col. 1, lines 5-8). Marshall further discloses that in order to determine if apparatus will malfunction as a result of electromagnetic energy unintentionally received from fields in the environment--for example, coupled by the cables

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associated with such apparatus acting as receiving aerials--it is well known to test said apparatus by exposure to a known energy environment. This has been accomplished hitherto either by establishing an electromagnetic field around the apparatus, or by injecting electrical energy directly into the connecting cables. The apparatus is said to be immune to a particular level of energy provided that malfunction does not result from its application. Examples of such methods are to be found in British Standard 905 and in Defence Standard 59-41. To achieve accurate and repeatable measurements such test methods and apparatus have been complex and bulky, and it has been necessary to use them in a well-defined spatial environment (Marshall - col. 1, lines 9-25).

**Allowable Subject Matter**

12. Claims 2-3, 5, 9-12, 15-18, 20 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

**Response to Arguments**

13. Applicant's arguments filed 12/16/2002 have been fully considered but they are not persuasive.

14. Applicant have only alleged that the Song et al. reference (the "X" reference in the EPO search) is "merely cumulative" without addressing any specifics of the Song et al. disclosure. No response is deemed necessary at this time.



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**Conclusion**

**15. Any inquiry concerning this communication or earlier communications from the examiner should be:**

**directed to:** Dr. Hugh Jones telephone number (703) 305-0023, Monday-Thursday 0830 to 0700 ET, *or* the examiner's supervisor, Kevin Teska, telephone number (703) 305-9704.

Any inquiry of a general nature or relating to the status of this application should be directed to the Group receptionist, telephone number (703) 305-3900.

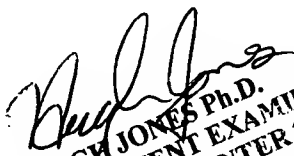
**mailed to:** Commissioner of Patents and Trademarks  
Washington, D.C. 20231

**or faxed to:** (703) 308-9051 (for formal communications intended for entry) *or* (703) 308-1396 (for informal or draft communications, please label "*PROPOSED*" or "*DRAFT*").

Dr. Hugh Jones

Primary Patent Examiner

May 14, 2003

  
HUGH JONES Ph.D.  
PRIMARY PATENT EXAMINER  
TECHNOLOGY CENTER 2100